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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/768,612

01/30/2004

Yisuo Li

CS03-048

6774

30402

7590

03/22/2005

WILLIAM STOFFEL

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EXAMINER

LINDSAY JR, WALTER LEE

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 03/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/768,612	Applicant(s) LI ET AL.	
	Examiner Walter L. Lindsay, Jr.	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) 13-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7, 8, 10 and 11 is/are rejected.
- 7) ☒ Claim(s) 5, 6 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |  |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

### **DETAILED ACTION**

This Office Action is in response to an Election filed on 1/06/2005.

Currently, claims 1-39 are pending. Claims 13-39 are withdrawn.

#### ***Election/Restrictions***

1. Applicant's election without traverse of claims 1-12 in the reply filed on 1/06/2005 is acknowledged.
2. Claims 13-39 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected device and alternative embodiments, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 1/06/2005.

#### ***Specification***

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-4, 7-8 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buynoski (U.S. Patent No. 5,729,045 dated 5/17/1998) in view of Whiston et al. (U.S. Patent No. 6,835,627 filed 1/10/2000).

Buynoski shows the method substantially as claimed, in Figs. 1-5 and corresponding text, as: providing a {001} silicon substrate (20) (col. 3, line 60-col. 4, line 6); forming a gate (G) over said silicon substrate; said gate having a width and a length; a channel under the gate; said channel having a channel direction parallel with the direction of said gate width; said channel direction is [100] or [010] direction (col. 4, line 7-22); and a twist of between about 40 and 50 degrees (col. 4, lines 7-22) (claim 1).

Additionally Buynoski shows that: the substrate is twisted between 40 and 50 degrees (col. 4, lines 7-22).

Buynoski lacks anticipation only on not explicitly teaching that: 1) implanting ions into said silicon substrate to form a doped region adjacent to said gate; the implantation of ions comprises a large angle tilt implant with a twist of between about 40 and 50 degrees and a tilt angle of 40 and 50 degrees (claim 1); 2) the doped region is a N-LDD in an offset LDMOS FET (claim 2); 3) said ions being implanted about a long the [110]

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directions of the silicon substrate (claim 3); 4) the implanting of said ions is performed in one implant step at an about 45 degree twist implant and a tilt angle of about 45 degrees (claim 4); 5) said channel has an annular shape with a doped region on the inside of said channel and a second doped region surrounding the outside of said channel (claim 7) 6) said channel has an annular shape with a doped region on the inside of said channel region and a second doped region surrounding the outside of said channel; and the implanting of said ions further comprises a quadra implant at the twist angles of about 45, 135, 225 and 315 degrees with a range of +/- 5 degrees; and a tilt angle between 40 and 50 degrees (claim 8); 7) further includes forming a High Vt NMOS FET from said gate and doped regions (claim 10); and 8) a LDMOS device is formed (claim 11).

Whiston shows the forming of an LDNMOS device. Whiston shows the formation an LDMOS device by implanting ions at a 45° tilt angle (col. 5, line 53-col. 6, line 16). The angled implant helps to achieve a desirably low drain/source threshold voltage the dose and energy level of the dopant required are such as to result in a relatively low punchthrough breakdown voltage (col. 1, line 62- col. 2, line 15).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the method Buynoski by adjusting the tilt angle between 40 and 50 degrees in a LDMOS device, as taught by Whiston, with the motivation that Whiston teaches that to achieve a desirably low drain/ source threshold voltage the dose and energy level of the dopant required are such as to result in a relatively low punchthrough breakdown voltage.

***Allowable Subject Matter***

7. Claims 5-6 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: the prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...wherein said silicon substrate has a notch/flat at a [110] direction, as required by claim 5;

...wherein the implanting of ion further comprises: said silicon substrate has a notch/flat at a <110> direction, the implantation comprises an implant with a 45 tilt and 45 twist and the ions enter the substrate aligned at a <0-1-1> direction whereby the direction increases the channeling, as required by claim 6; and

...forming a second gate over said silicon substrate; said second gate having a width and a length; a second channel under the second gate; said second channel having a second channel direction parallel with the direction of width of said second gate; said second channel direction is parallel or perpendicular with the <110> direction, as required by claim 12.

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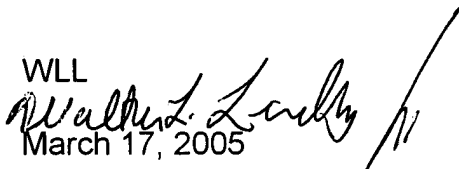
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter L. Lindsay, Jr. whose telephone number is (571) 272-1674. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Walter L. Lindsay, Jr.  
Examiner  
Art Unit 2812

WLL  
  
March 17, 2005